

REMARKS

Claims 1-24 are pending in the application.

Claims 1, 5-18, 20-22 and 24 stand rejected.

Claims 2-4, 19 and 23 stand objected to.

I. REJECTION UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

Claims 2-4 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention. The Applicants respectfully traverse the rejection of claims 2-4 under 35 U.S.C. § 112, second paragraph.

The Examiner asserts that in claim 2, and claims depending therefrom, “said structure” lack antecedent basis. The Applicants have hereinabove amended claim 2 to recite “said portion” in lieu of “said structure.” The Applicants respectfully request the withdrawal of the rejection of claims 2-4 under 35 U.S.C. § 112, second paragraph.

II. REJECTION UNDER 35 U.S.C. § 102

Claims 1, 5, 18, 22 and 24 have been rejected under 35 U.S.C. § 102 as being anticipated by *Aoki*, Japanese Patent No. JP8-167595. The Applicants respectfully traverse the rejection of claims 1, 5, 18, 22 and 24 under 35 U.S.C. § 102(b).

Claim 1 is directed to a depolarization method including the step of selectively exposing a portion of a fabrication tool to a plasma for a selected time interval. The selected time interval has a duration sufficient to reduce a polarization of the portion of the fabrication tool whereby interference with a motion of a device being processed by the fabrication tool is not observed. The Examiner asserts that *Aoki* discloses the method of claim 1 including the step of selectively exposing a portion of a fabrication tool (the pad as disclosed in *Aoki*) to a plasma for a selected time interval

to reduce a polarization of the portion of the fabrication tool. The Examiner has accorded no patentable weight to the limitation in claim 1 to the functional limitation "whereby interference with the motion of a device being processed by the fabrication tool is not observed" on the ground that this limitation is inherent in *Aoki*, although admittedly not expressly found in the reference. (Paper No. 2, pages 2-3.)

The Applicants respectfully assert that *Aoki* has not been shown to teach the identical invention of claim 1. The Applicants respectfully disagree that *Aoki* discloses a depolarization method including the step of selectively exposing a portion of the pad to a plasma for a selected time interval to reduce the polarization of the portion of the fabrication tool. The Applicants also respectfully disagree that the element "whereby interference with the motion of a device being processed by the fabrication tool is not observed" is inherent in *Aoki*.

Aoki discloses a plasma treatment device in which a work piece is placed on an electrostatic chuck mechanism of the pad (reference number 4) and a plasma is produced inside the treatment chamber to treat the work piece. (*Aoki*, Constitution.) There is nothing in this teaching that discloses selectively exposing the pad to a plasma for a selected time interval to reduce a polarization of the pad. *Aoki* further discloses that the purpose of the *Aoki* device is to prevent abnormal discharge from occurring in the vicinity of the pad (*Aoki*, Purpose.) Thus, neither of the aforementioned teachings of *Aoki* discloses, at least, selectively exposing a portion of a fabrication tool to a plasma for a selected time interval to reduce a polarization of the portion of the fabrication tool. Additionally, as understood by the Applicants, *Aoki* teaches that insulating part 41 is provided to help prevent the abnormal discharge. (See *Aoki*, column 2, lines 33-37.) (A translation of a portion of *Aoki* is attached herewith.) Thus, the Applicants respectfully contend that *Aoki* has not been shown to disclose exposing a portion of a fabrication tool for a selected time interval to reduce a polarization of a portion of a portion of the fabrication tool.

The Applications also respectfully disagree that the limitation with respect to interference with a motion of a device being processed, not being observed is inherent in *Aoki*. As an initial

matter, an assertion of inherency must be supported by a showing of objective evidence that the allegedly inherent characteristic is necessarily present in the apparatus described in the reference and would be so recognized by persons of ordinary skill in the art. MPEP § 2112. Furthermore, inherency may not be established by probabilities or possibilities. *Id.* (The Applicants note that nothing in the holding in *In re Cruciferous Sprout Litigation* cited by the Examiner is to the contrary.) *See In re Cruciferous Sprout Litigation*, 64 U.S.P.Q.2d 1202 (C.A.F.C. 2002)). In particular, no evidence has been provided that indicates that interference with a motion of a device being processed by the fabrication tool is not observed in response to selectively exposing a portion of the fabrication tool to a plasma for a selected time interval to reduce the polarization of the portion of the fabrication tool is necessarily present in *Aoki*. Furthermore, the Applicants respectfully submit that no such evidence would be expected in view of the purpose of *Aoki*, namely to reduce abnormal discharge from occurring the vicinity of the wafer pad, not depolarization of a portion of the tool.

Thus, for at least the aforesaid reasons, the Applicants respectfully contend that *Aoki* does not teach the identical invention of claim 1. Therefore, *Aoki* does not anticipate claim 1 and claim 1 is allowable under 35 U.S.C. § 102 over *Aoki*. MPEP § 2131.

Claim 5 is directed to the method of claim 1 in which 5. the portion of the fabrication tool comprises an insulating pad. *Aoki* shows a work piece W, disposed on pad 4. *Aoki* also teaches that pad 4 is provided with an insulating part 41 at the peripheral part of its surface. (*Aoki*, Constitution and Figure 1.) (Note that the work piece completely overlays the insulating ring, which itself would not be understood to be an “insulating pad.”) Thus, *Aoki* does not disclose exposing a insulating pad to a plasma from a plasma flood gun for a selected time interval Consequently, *Aoki* does not teach the identical invention of claim 5. Therefore, *Aoki* does not anticipate claim 5 and claim 5 is allowable under 35 U.S.C. § 102 over *Aoki*. *See* MPEP § 2131.

Claim 18. is directed to depolarization method comprising the step of selectively exposing a portion of a fabrication tool to a plasma for a selected time interval. The Applicants respectfully disagree that *Aoki* discloses a depolarization method including the step of selectively exposing a

portion of a fabrication tool to a plasma for a selected time interval. *Aoki* discloses a plasma treatment device in which a work piece is placed on an electrostatic chuck mechanism of the pad (reference number 4) and a plasma is produced inside the treatment chamber to treat the work piece. (*Aoki* Constitution.) There is nothing in this teaching that discloses selectively exposing a portion of a fabrication tool to a plasma for a selected time interval. *Aoki* further discloses that the purpose of the *Aoki* device is to prevent abnormal discharge from occurring in the vicinity of the pad (*Aoki*, Purpose.)

Similarly to claim 5, claim 22, depending from claim 18 recites the limitation in which the portion of the fabrication tool comprises an insulating pad. For the reasons discussed in conjunction with claim 5, the Applicants also respectively contend that claim 22 is allowable under 35 U.S.C. § 102 over *Aoki*.

Claim 24 is directed to the method of claim 18 wherein the portion of the fabrication tool is in a vacuum region of said fabrication tool. (The Applicants note that the preamble of claim 24 has been rewritten hereinabove to replace "process" with "method" to conform the preamble to the base claim.) Because, for the reasons discussed above, *Aoki* has not been shown to teach the portion of the fabrication tool as recited in claim 18, *Aoki* necessarily does not teach the fabrication tool as recited in claim 24 depending therefrom. Thus, the Applicants also respectively contend that claim 24 is allowable under 35 U.S.C. § 102 over *Aoki*.

III. REJECTION UNDER 35 U.S.C. § 103

Claim 13 has been rejected under 35 U.S.C. § 103 as being unpatentable over *Aoki*. The Applicants respectfully traverse the rejection of claim 13 under 35 U.S.C. § 103.

Claim 13 is directed to the method of claim 1 in which the preselected time interval is preselected from the range of five minutes to ten minutes. Claim 13 has been rejected on the teaching of *Aoki* as applied with respect to claim 1. (Paper No. 2, page 3.) Additionally, the Examiner asserts that it would have been obvious to one of ordinary skill in the art to have selected

a particular exposure time interval to ensure proper depolarization of the fabrication tool on the ground that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill in the art. (Paper No. 2, page 3) (citing *In re Aller*, 105 U.S.P.Q. 233 (C.C.P.A. 1955)). However, the Applicants respectfully contend that the holding in *In re Aller* is inapplicable. Here, the general conditions of the claim are not disclosed in the prior art. For example, nothing has been identified in *Aoki* that discloses exposing a portion of a fabrication tool for a selected time interval having a duration sufficient to reduce a polarization of the fabrication tool. (Indeed, as discussed hereinabove, *Aoki* is not directed to depolarizing the fabrication tool at all.) Consequently, the teaching in *In re Aller* with respect to the discovery of a workable range by routine experimentation is not applicable to the limitations of claim 13. *See also* MPEP § 2144.05. Thus, a *prima facie* showing of obviousness has not been made with respect to claim 13. Therefore, the Applicants respectfully contend that claim 13 is allowable under 35 U.S.C. § 103 over *Aoki*.

IV. REJECTION UNDER 35 U.S.C. § 103

Claims 6-12, 14-17, 20 and 21 have been rejected under 35 U.S.C. § 103 as being unpatentable over *Aoki* in view of *Farley et al.*, U.S. Patent No. 6,271,529 ("*Farley*"). The Applicants respectfully traverse the rejection of claims 6-12, 14-17, 20 and 21 under 35 U.S.C. § 103.

Claim 6 is directed to the method of claim 1 in which the plasma comprises the plasma form from a noble gas. Claim 7 further depends from claim 6 and recites the noble gas being selected from the group consisting of xenon and argon.

The Examiner contends that *Aoki* teaches all of the limitations of claims 6 and 7 but for the disclosure of noble gases and noble gases such as xenon or argon in particular. (Paper No. 2, page 4.) The Examiner relies on *Farley* as providing the teaching with respect to the noble gases xenon and argon. (Paper No. 2, page 4.) The Applicants note however that *Aoki* refers to chemical

compounds such as tetrafluoromethane (CF₄), trifluoromethane (CHF₃), octafluorocyclobutane (C₄F₈) and chlorine (Cl₂). (*Aoki*, column 4, lines 25-26.) The Applicants note that each of these compounds includes an active species (fluorine, chlorine). Therefore, the Applicants respectfully contend that substituting a noble gas such as xenon or argon, for example, would render *Aoki* unsuitable for its intended purpose. Therefore, there can be no suggestion or motivation to modify *Aoki* in view of *Farley* to make the invention of claims 6 and 7. Furthermore, for the reasons discussed hereinabove, *Aoki* does not teach the limitation in claim 6 and 7 incorporated therein from base claim 1.

Because neither *Aoki* or *Farley* alone or in combination teach or suggest all of the limitations of claim 6 and 7, nor is there a motivation or suggestion to modify *Aoki* to make the inventions of claim 6 and 7, the Applicants respectfully assert that a *prima facie* showing of obviousness has not been made with respect to these claims. Consequently, claims 6 and 7 are allowable under 35 U.S.C. § 102 U.S.C. 103 over *Aoki* and *Farley*.

Claim 8 depends from claim 1 and recites the method thereof and further comprising the step of generating the plasma with a plasma flood gun. The Examiner relies on *Farley* as teaching a plasma flood gun (Paper No. 2, page 4.) As *Farley* teaches, however, the plasma generator in *Farley* generates a plasma to neutralize the ion beam (of the implanter) and the work piece surface. (*Farley*, column 4, lines 44-46.) The Examiner also states that *Farley* so teaches. (Paper No. 2, page 4.) Consequently, neither *Aoki* nor *Aoki* in combination with *Farley* teach a flood gun produced plasma exposing a portion of a fabrication tool for a selected time interval Consequently, neither *Aoki* nor *Aoki* in combination with *Farley* teach or suggest all of the limitations of claim 8. With respect to a motivation for combining or modifying the references, the Examiner asserts that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a plasma flood gun in the device of *Aoki* to introduce a neutralizing charge to the work piece. This motivation is not germane to the invention of claim 8. There are no limitations in claim 8 directed to the application of a plasma flood gun to introduce a neutralizing charge to a work piece.

Thus, for at least the aforesaid reasons, the Applicants respectfully contend that a *prima facie* showing of obviousness has not been made with respect to claim 8. Consequently, claim 8 is allowable under 35 U.S.C. § 103 over *Aoki* and *Farley*.

Claim 9 is directed to the method of claim 8 in which the plasma flood gun includes an arc discharge. The limitation of claim 8 has not been explicitly addressed by the Examiner. (See Paper No. 2, page 4.) The foregoing notwithstanding, however, for at least the reasons discussed in conjunction with claim 8, *Aoki* and *Farley*, either alone or in combination, do not teach or suggest all of the limitations of claim 9, nor is there a motivation or suggestion for modifying the references to make the invention of claim 9. (As noted hereinabove, the motivation does not address the limitations of claim 9, nor is it found in one of the three possible sources thereof, namely, the references themselves, the knowledge of persons of ordinary skill in the art, or the nature of the problem to be solved. See MPEP § 2143.01.) Therefore, the Applicants respectfully assert that claim 9 is allowable under 35 U.S.C. § 103 over *Aoki* and *Farley* inasmuch as a *prima facie* showing of obviousness has not been made with respect thereto.

Claim 10 further depends from claim 9 and recites the method thereof in which the arc discharge is struck between a hot filament cathode and an anode. Again, the express limitation of claim 10 has not been addressed. (See Paper No. 2, page 4.) The foregoing notwithstanding, as previously discussed, neither *Aoki* nor *Aoki* in combination with *Farley* teach or suggest all of the limitations of claim 10. Neither is there a suggestion to modify the references to make the invention of claim 10. Consequently, a *prima facie* showing of obviousness has not been made with respect to claim 10. Thus, claim 10 is allowable under 35 U.S.C. § 103 over *Aoki* and *Farley*.

Claim 11 further depends from claim 10 and recites the method thereof in which the arc discharge has a voltage drop between the cathode and the anode of between 10 and 30 volts. Again, the express limitation of claim 10 has not been addressed. (See Paper No. 2, page 4.) A search on an electronic version of *Farley* does not yield any instances of an arc discharge voltage drop between cathode and anode of between 10 and 30 volts. Indeed, the Applicants find no reference to a voltage

drop between the anode and cathode of an arc discharge whatsoever. Thus, for at least this reason and those discussed hereinabove, neither *Aoki* or *Farley*, alone or in combination, teach or suggest all of the limitations of claim 11. Neither is there a suggestion provided for modifying the references to make the invention of claim 11. Therefore, the Applicants respectfully contend that a *prima facie* showing of obviousness has not been made with respect to claim 11, and claim 11 is allowable under 35 U.S.C. § 103 over *Aoki* and *Farley*.

Claim 12 depends from claim 8 and recites the method thereof in which the step of exposing the portion of the fabrication tool comprises the step of positioning the portion of the fabrication tool in proximity to an aperture of the plasma flood gun. The Examiner contends that *Farley* discloses a flood gun having an aperture position and proximity to a fabrication tool for generating a plasma formed from a noble gas to neutralize the ion beam and the work surface (Paper No. 2, page 4.) As previously noted, nothing has been identified in *Farley* that discloses positioning a portion of a fabrication tool in proximity to an aperture of a plasma flood gun. Neither would such teaching be expected in view of the applications of both *Aoki* and *Farley*. Neither is a motivation or suggestion for modifying the references to make the invention of claim 12 from one of the possible sources thereof been provided. Thus, for at least these reasons and those discussed hereinabove, the Applicants respectfully contend that a *prima facie* showing of obviousness has not been made with respect to claim 12. Therefore, claim 12 is allowable under 35 U.S.C. § 103 over *Aoki* and *Farley*.

Claim 14 is directed to a depolarization process comprising the steps of positioning an insulating pad in proximity to an aperture of a plasma flood gun, and exposing the insulating pad to a plasma from the plasma flood gun for a selected interval of time wherein the selected interval of time has a duration sufficient to reduce polarization of the structure whereby interference with a motion of a device supported on the insulating pad is not observed. The rejection of claim 14 is based on the same assertions with respect to *Aoki* and *Farley* made in conjunction with claims 6-12. (See Paper No. 2, pages 3-4.) As previously discussed, *Farley* teaches a plasma generator for neutralizing a work piece surface. Plainly, a work piece surface is not an insulating pad. Similarly,

Aoki shows a work piece W, disposed on pad 4. *Aoki* also teaches that pad 4 is provided with an insulating part 41 at the peripheral part of its surface. (*Aoki*, Constitution and FIGURE 1.) (Note that the work piece completely overlays the insulating ring, which itself would not be understood to be an "insulating pad.") Thus, similarly to *Farley*, *Aoki* does not disclose exposing a insulating pad to a plasma from a plasma flood gun for a selected time interval Additionally, no motivation or suggestion for modifying the references to make the invention of claim 14 from one of the possible sources thereof have been provided. Thus, because the references, alone or in combination do not teach or suggest all of the limitations of claim 14, and because there is no motivation for modifying the references to make the invention of claim 14, the Applicants respectfully assert that a *prima facie* showing of obviousness has not been made. Consequently, claim 14 is allowable under 35 U.S.C. § 103 over *Aoki* and *Farley*.

Claim 15 is directed to the process of claim 14 in which the plasma is formed from a noble gas. Claim 16 further depends from claim 15 and recites the noble gas as selected from a group consisting of xenon and argon. The limitations of claims 15 and 16 have been previously discussed hereinabove in conjunction with claims 6 and 7, respectively. For at least those reasons, and those discussed in conjunction with claim 14, the Applicants also respectfully assert that a *prima facie* showing of obviousness has not been made with respect to claims 15 and 16. Therefore, claims 15 and 16 are allowable under 35 U.S.C. § 103 over *Aoki* and *Farley*.

Claim 17 is directed to the process of claim 14 and further including the step of generating the plasma striking an arc discharge in a gas supplied ~~to~~ the plasma flood gun. The express limitation of claim 17 has not been explicitly addressed. (See Paper No. 2, page 4.) The foregoing notwithstanding, however, for at least the reasons discussed hereinabove in conjunction with claim 9 and claim 14, the Applicants respectfully assert that neither *Aoki* nor *Aoki* in combination with *Farley* teach or suggest all of the limitations of claim 17. For at least this reason, a *prima facie* showing of obviousness has not been made with respect to claim 17, and thus, claim 17 is allowable under 35 U.S.C. § 103 over *Aoki* and *Farley*.

Claim 20 is directed to depolarization method as recited in claim 18, including the step of selectively exposing a portion of a fabrication tool to a plasma for a selected time interval in which the plasma comprises a plasma formed from a noble gas. For the reasons discussed hereinabove in conjunction with claim 18, and claims 6 and 15, the Applicants respectfully assert that neither *Aoki* nor *Aoki* in combination with *Farley* teach or suggest all of the limitations of claim 20. Neither is there a motivation or suggestion for modifying the references to make the invention of claim 20. (See discussion hereinabove with respect to claims 6 and 7.) Consequently, the Applicants respectfully contend that a *prima facie* showing of obviousness has not been made with respect to claim 20. Therefore, claim 20 is allowable under 35 U.S.C. § 103 over *Aoki* and *Farley*.

Claim 21 is directed to the method of claim 18 and further including the step of generating the plasma with the plasma flood gun. For at least the reasons discussed hereinabove in conjunction with claim 18, and because there is no motivation or suggestion for modifying the references to make the invention of claim 21, the Applicants respectfully assert that a *prima facie* showing of obviousness has not been made with respect to claim 21. Consequently, claim 21 is allowable under 35 U.S.C. § 103 over *Aoki* and *Farley*.

V. ALLOWABLE SUBJECT MATTER

Claims 2-4, 19 and 23 have been deemed allowable if rewritten or amended to overcome the rejections under 35 U.S.C. § 112, second paragraph. As discussed hereinabove, the Applicants have rewritten claim 2 hereinabove, which amendment is incorporated in dependent claims 3 and 4 by reference. Consequently, claims 2-4 are in condition for allowance. With respect to claim 19, the Applicants have rewritten claim 19 hereinabove to correct a typographical error deleting the repeated "of said portion" in line 2 of claim 19. Applicants note that claims 19 and 23 have not been rejected under 35 U.S.C. § 112, second paragraph. The Applicants further understand that claims 19 and 23 would be allowable if rewritten in independent form to include the limitations of the base claim or any intervening claims. The Applicants also note that the preamble of claim 23 has been rewritten hereinabove to replace "process" with "method" to conform the preamble to the base claim. The

Applicants appreciate the Examiner's deeming that claims 2-4, 19 and 23 are allowable subject matter.

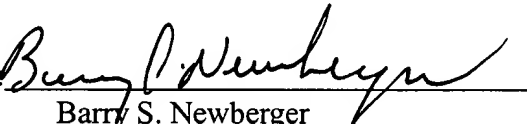
VI. CONCLUSION

As a result of the foregoing, it is asserted by Applicants that the remaining Claims in the Application are in condition for allowance, and respectfully request an early allowance of such Claims.

Applicants respectfully request that the Examiner call Applicants' attorney at the below listed number if the Examiner believes that such a discussion would be helpful in resolving any remaining problems.

Respectfully submitted,

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Brief English Translation of a Portion of JP408167595A

Purpose: To be able to control the abnormal discharge in the vicinity of wafer platen and to provide a plasma process equipment.

Composition: In the sealed process container 2, there is a electrostatic chuck 4 and a wafer to be held on chuck 4. The said process container 2 has plasma inside and is a plasma process instrument for semiconductor's. The said platen 4 has electrostatic chuck and the surrounding of its surface 43 has insulating material 41.

Claim 1: same as the content in composition

Claim 2: The said insulating layer is within the 10mm range from the chuck and its perimeter in Claim 1's plasma process instrument.

Claim 3: The said contact surface has a characteristic 10 micron roughness in the said Claim 1 and Claim 2's plasma process instrument.

The invention's details:

[0001] This is a plasma process instrument.

[0002] The said instrument has the following technical details. For instance, it can be used for semiconductor etching and CVD processes.

This process instrument has a preset temperature on the wafer which is on top of the platen. The electrostatic chuck uses electrostatic force and the chuck uses conductive materials. For example, the lower electrode uses aluminum and the outside of the lower electrode uses anodized aluminum coating.

[0003] The said design of the electrostatic chuck is a plasma etching instrument. The instrument has an automatically pumped vacuum container in which there are two opposite and parallel electrodes. The to be processed semiconductor wafer is placed on the lower electrode which is an electrostatic chuck. During the etching process, an etching gas is bled into the process chamber. An increase in voltage or current on either or both of the electrodes generates plasma in between the electrodes. The plasma ionizes the etching gas and finishes the etching process.

[0004] Prior art has the following short comings. For instance, between the electrostatic chuck and the insulating layer charges may build up due to the RF field in the process. The glue in the affected areas may form bubbles due to the heat from the plasma that can lead to the separation and exposure of the conductive part of electrodes.

On the electrical side, since the conductive materials have low insulating durability, there are often abnormal electrical discharges causing damage to the chuck, etc.

[0005] This invention is to solve the above problems.

[0006] The method to solve the problems: same as in Claim 1.

[0007] Same as in Claim 2.

[0008] Same as in Claim 3.

[0009] According to this invention, since the platen and the electrostatic chuck's surface and the surroundings have an insulating layer, it is very difficult for the conductive parts to be exposed. In addition, since the durability of the insulating layer is increased, this helps to prevent the abnormal discharge on the contact surface and the surrounding areas.

[0033] The captions for the figures in this invention

Figure 1,	Displays an example of the plasma process instrument
Figure 2,	The zoom-in cross section plot for the main part of the platen in
Figure 1.	
Figure 3,	a. Display of the cross section of platen in Figure 1.
	b. Display of the cross section of platen in Figure 1.
	c. Display of the cross section of platen in Figure 1.
	d. Display of the cross section of platen in Figure 1.
Figure 4,	The side view of the platen in Figure 1.
Figure 5,	The description of the process functions in Figure 1.
Figure 6,	Illustration of second example with the cross section of the main
part of the platen.	